# Mechanical Cleaning of SRS Tanks 18 and 19

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# Agenda

- Initial Conditions
- System Overview
  - Sand Mantis
  - Hose-in-Hose Transfer System
  - Grinder
  - Control Skids
- Operation
- Results
- Questions and Answers

# Tank 18 Initial Conditions

Tank 18 contained:

~4,300 gal of wet solids
~2,500 gal of free liquid
~6,700 gal total

# Tank 19 Initial Conditions

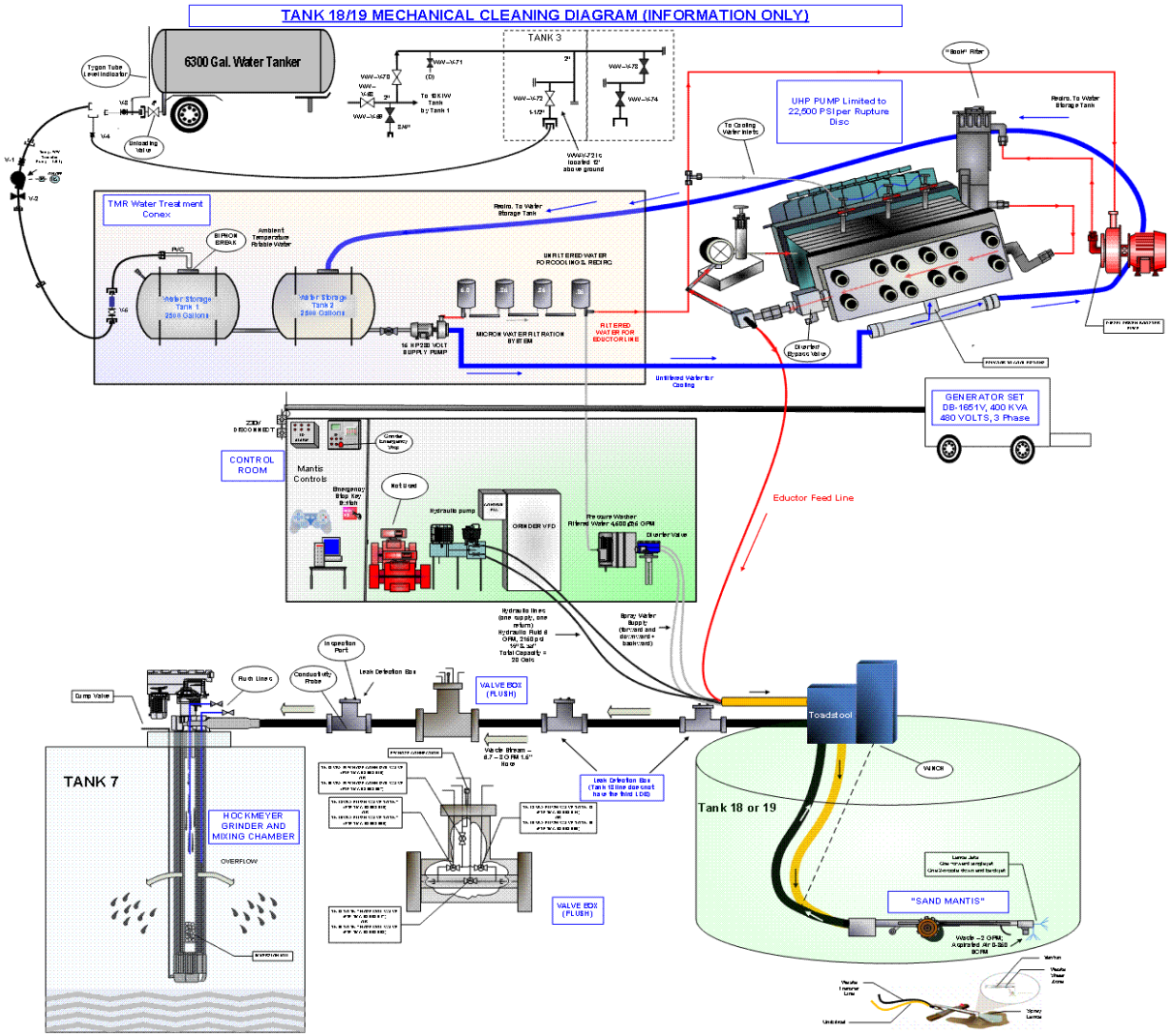
Tank 19 contained:

~15,000 gal wet solids

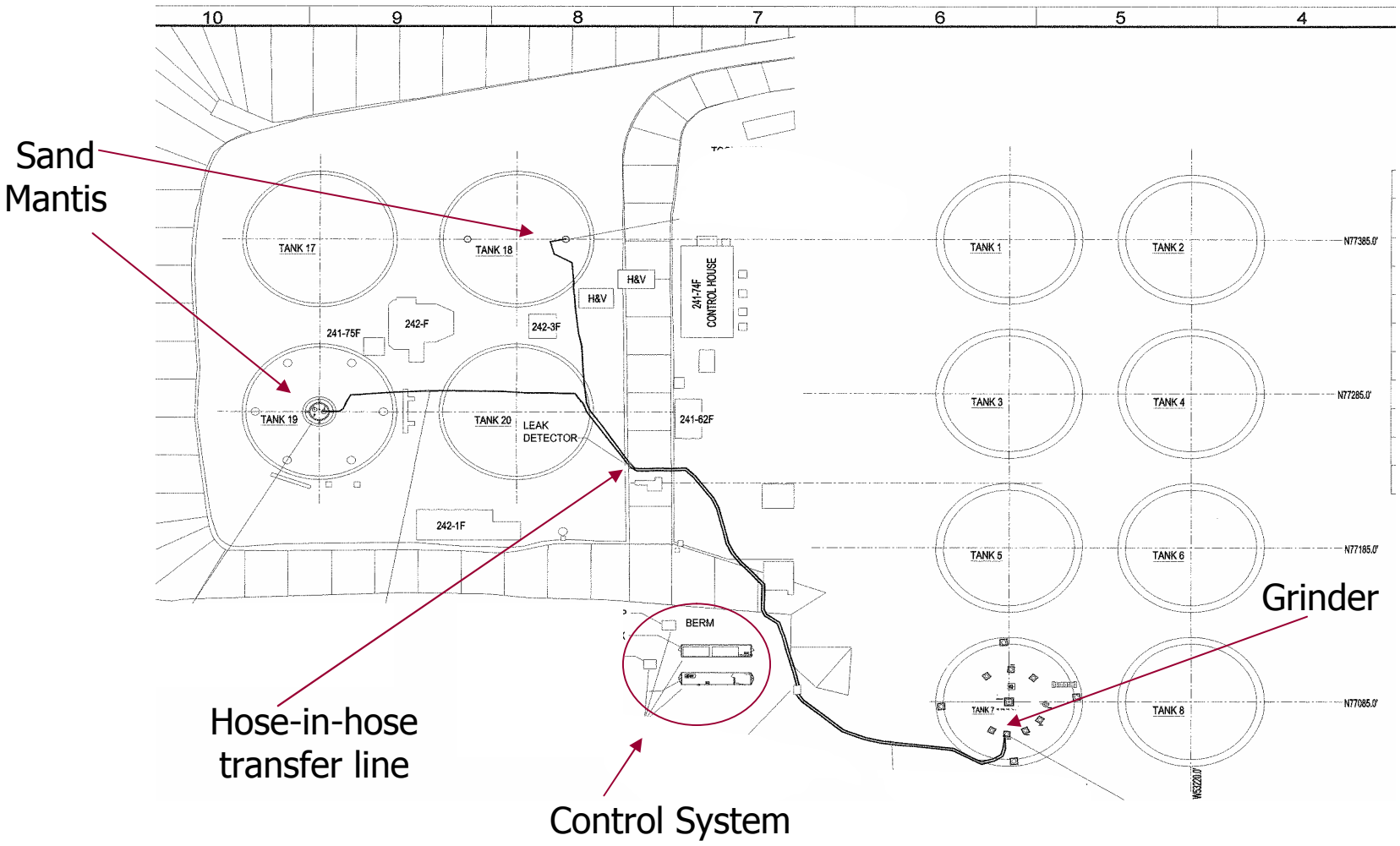
~1,800 gal free liquid

~16,800 gal total

# Tank 18 and 19 System Overview



# Tanks 18 and 19 System Overview



# Sand mantis

# Toadstool

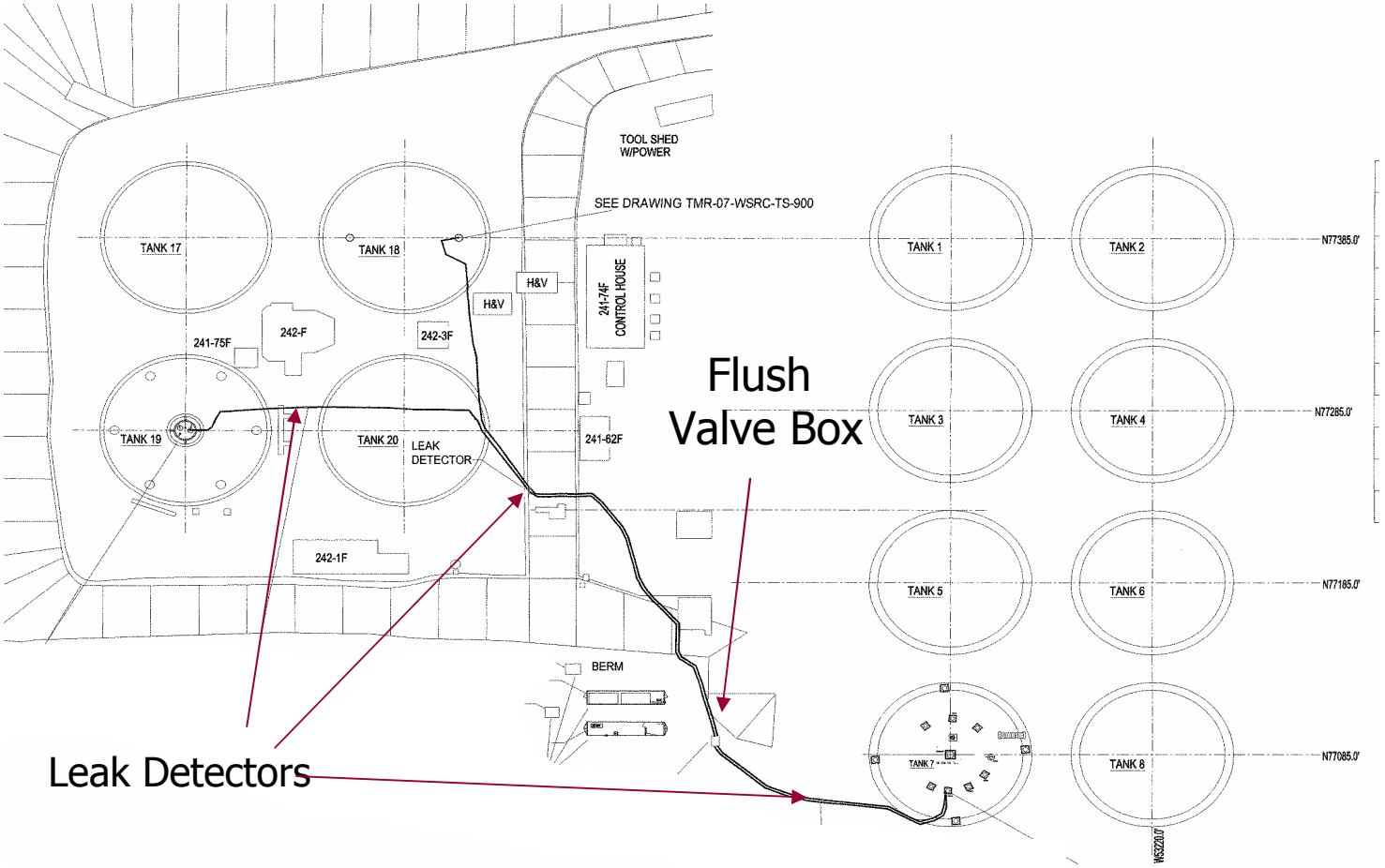
# Sand Mantis

- **High Pressure / Low Flow Eductor Design**
  - 17,500 psig supply water pressure
  - 6 gpm water
  - Generates ~40 psi head at discharge
- **Three phase flow**
  - Relies on water and air to push solids through the system
  - Operates on “wet floor” not submerged (<6” water)
- **Forward spray**
  - 5,000 psig used to break up mounds, wash the floor, and provide liquid for pumping

# Sand Mantis

- Uses hydraulics to move mantis in the tank
- Designed to handle obstructions in the tank
  - Steel Tapes
  - Thermowells
  - Sludge mounds

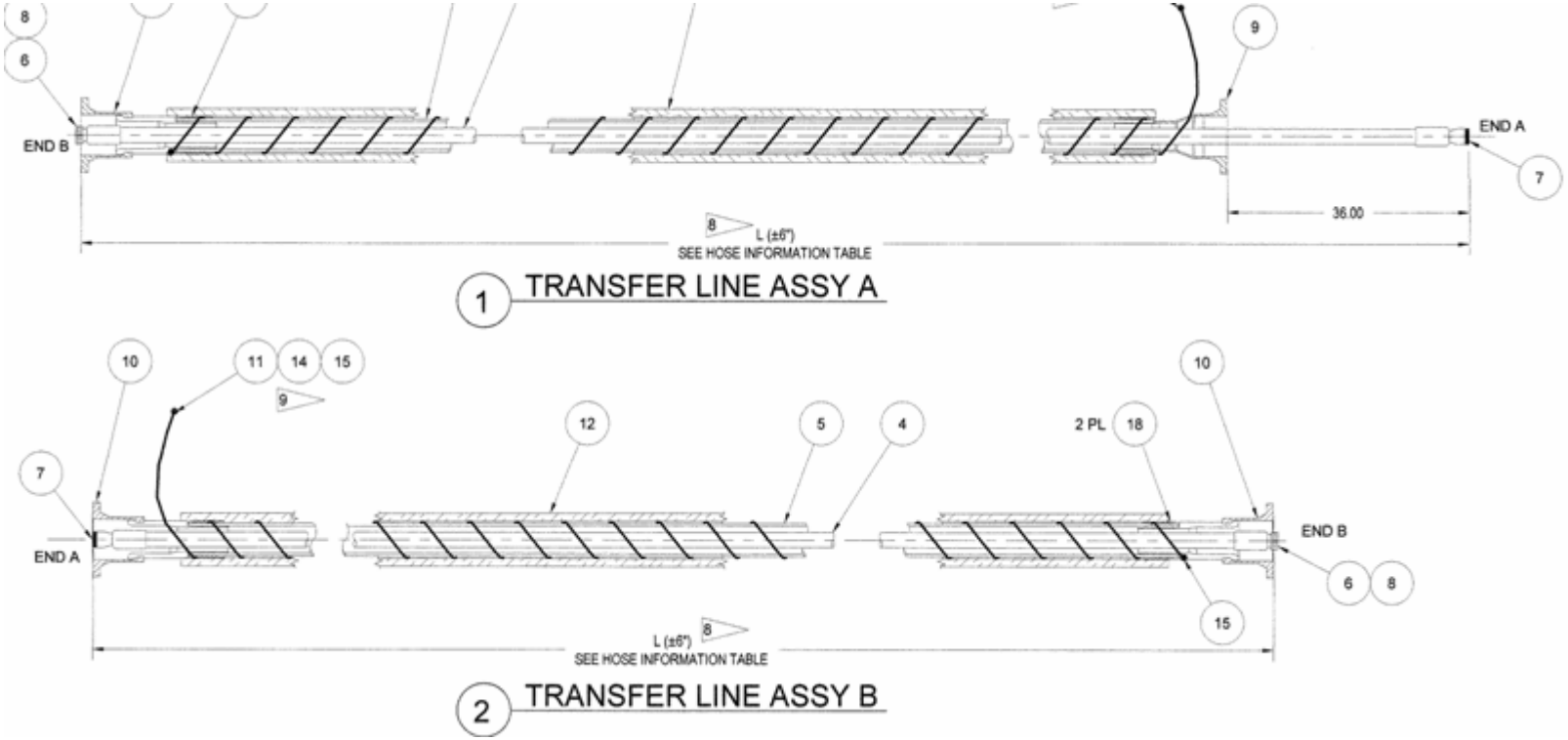
# Hose-in-hose System Overview



# Hose-in-Hose System

- **Design Requirements**
  - Federal Facilities Agreement
  - ASME B31.3
- **Process Requirements**
  - Heat Trace (condensation)
  - Flow requirements
  - Chemical compatibility
  - Shielding

# Hose-in-hose System

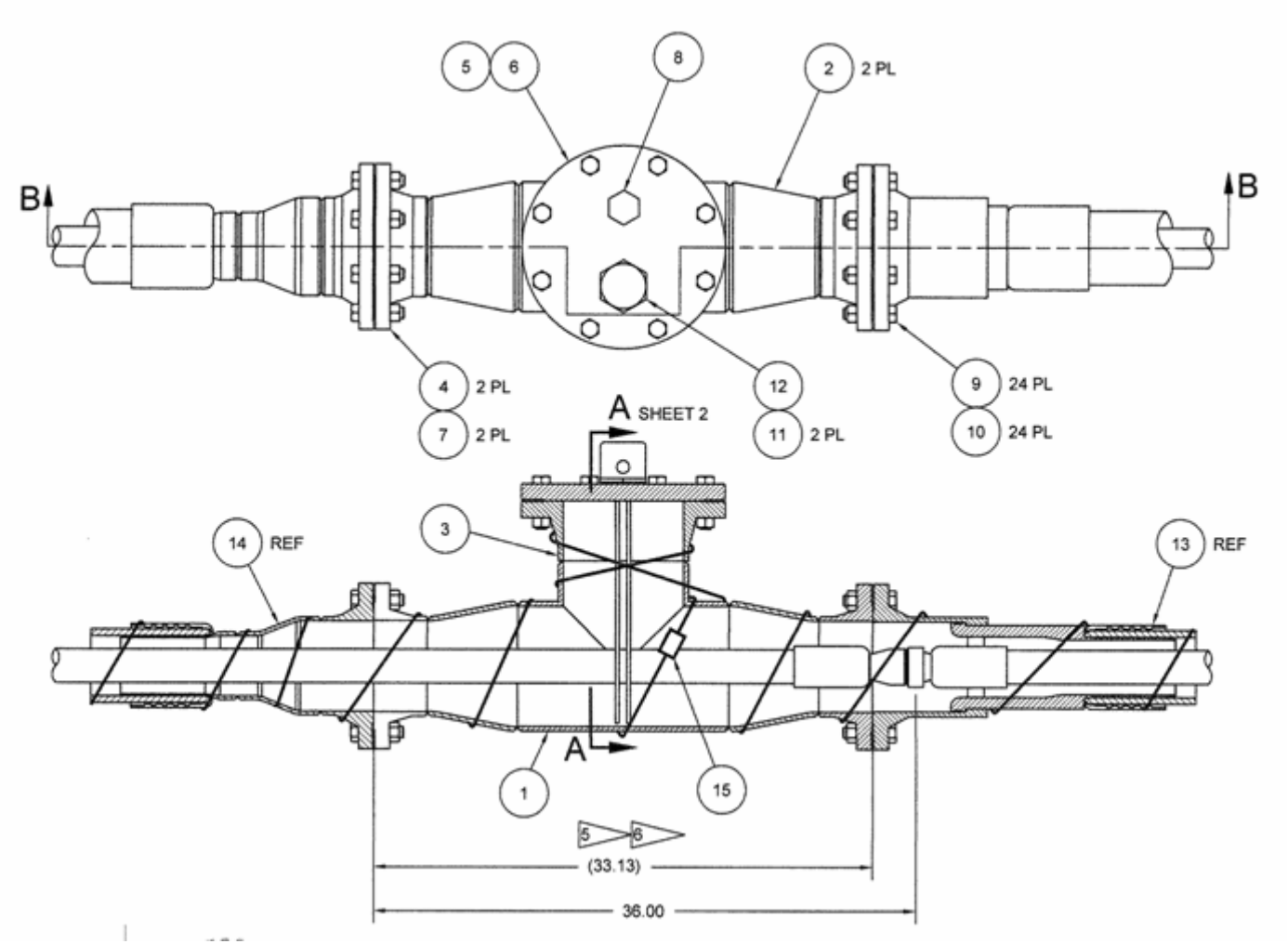


# Hose-in-Hose Transfer Line

# Hose-in-hose System

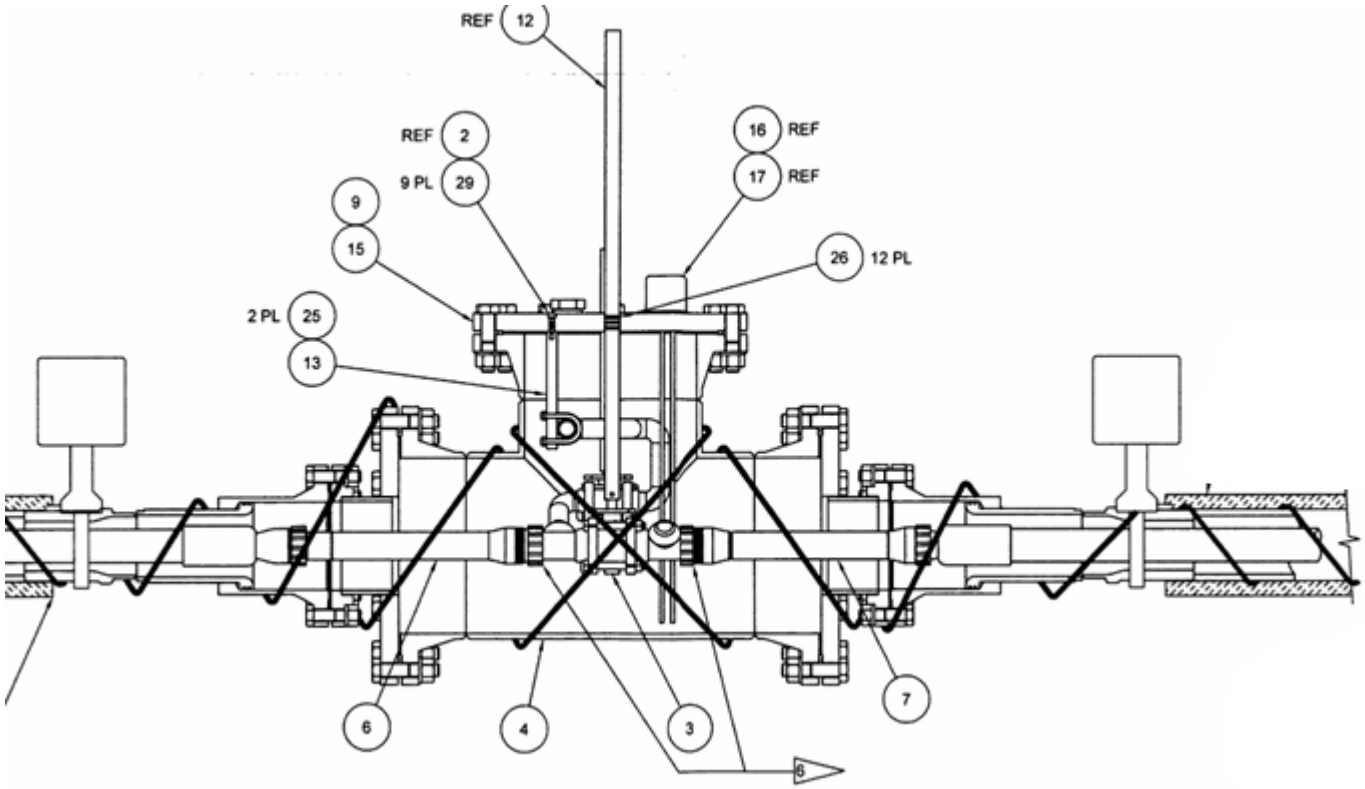
- Hose is manufactured by River Bend Transfer Systems, LLC
- This type of hose has been used at Hanford
- Hose is 1.5” primary inside 4” secondary
- Hose connections are specialty from manufacturer and use o-rings to seal
- Secondary connection has threading mechanism to allow testing of primary
- Outer hose is heat traced and insulated

# Hose-in-hose System – Leak Detector



# Hose-in-hose System - Leak Detector

# Hose-in-hose system – Flush Valve Box



# Hose-in-hose system – Flush Valve Box

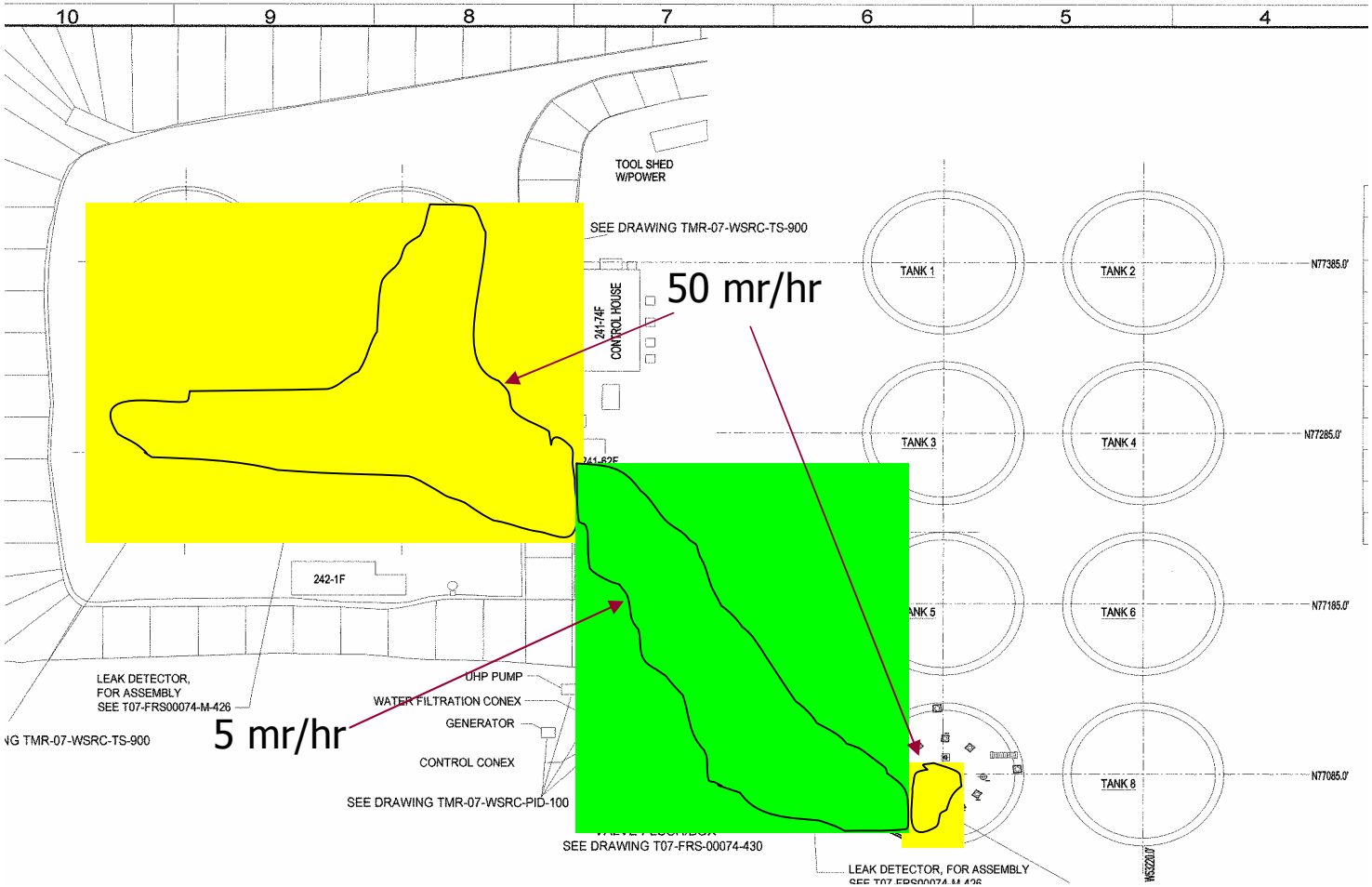
## Hose-in-hose System – Leak Detector and Flush Valve Box

- Leak Detectors and Flush Valve Boxes are manufactured by TMR
- Constructed from stainless steel standard piping components (tees, reducers, flanges)
- Uses conductivity probe to detect level

# Hose-in-hose System

- **Shielding requirements**
  - **Meets standard SRS Radiation Control Program (5Q).**
  - **Sand bags used as shielding**
  - **Controlled to 5 mr/hr in high traffic areas and 50 mr/hr in low traffic areas**

# Shielding


10
9
8
7
6
5
4
TOOL SHED
W/POWER
SEE DRAWING TMR-07-WSRC-TS-900
241-74F
CONTROL HOUSE
50 mr/hr
TANK 1
TANK 2
TANK 3
TANK 4
TANK 5
TANK 6
TANK 8
N77385.0'
N77285.0'
N77185.0'
N77085.0'
242-1F
LEAK DETECTOR,
FOR ASSEMBLY
SEE T07-FRS00074-M-426
NG TMR-07-WSRC-TS-900
5 mr/hr
UHP PUMP
WATER FILTRATION CONEX
GENERATOR
CONTROL CONEX
SEE DRAWING TMR-07-WSRC-PID-100
SEE DRAWING T07-FRS-00074-430
LEAK DETECTOR, FOR ASSEMBLY

# Shielding

# Grinder

- Grinder manufactured by Hockmeyer
  - History of producing grinder for a variety of industries including paint/pigment and pharmaceuticals
- Grinds Zeolite to match particle size distribution of standard sludge
  - Maximum of 38 microns
  - Mean of between 5 and 20 microns

# Grinder

# Control Skids

- Diesel Generator
- Diesel Powered Ultra High Pressure Pump
- Shipping Container (Control Conex)
  - Control Room
  - Electrical Panels
  - Hydraulic Pump
  - High Pressure Pump
- Shipping Container (Water Conex)
  - 2 x 2500 gallon poly tanks
  - Water supply pump and filters

# Control Skids

# Control Skids

# Tank 18 Operation

## Tank 18

- Total run time: ~420 hours
- Total water used: ~115 kgal

## Tank 19

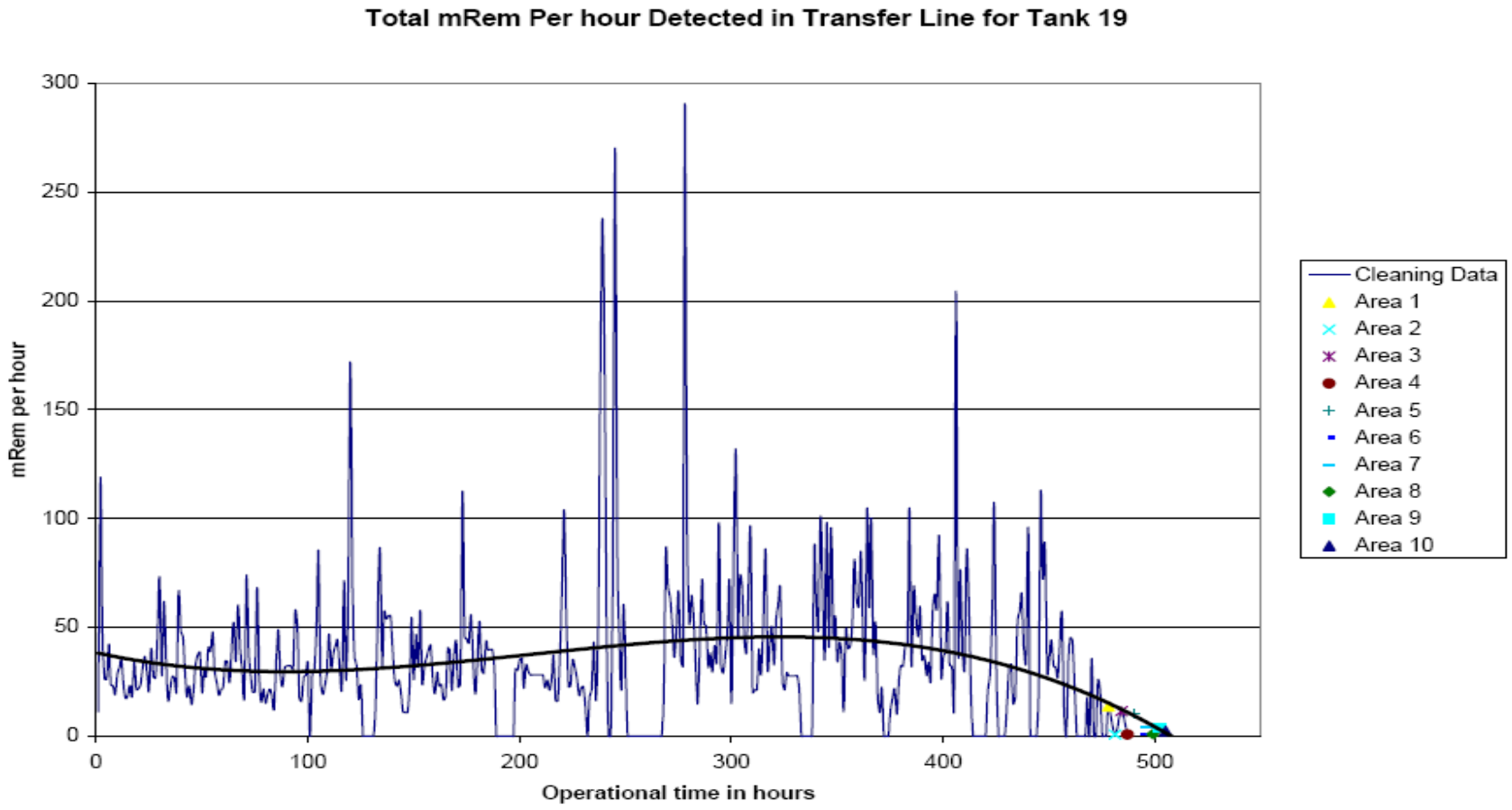
- Total run time: ~450 hours
- Total water used: ~160 kgal

# Operation

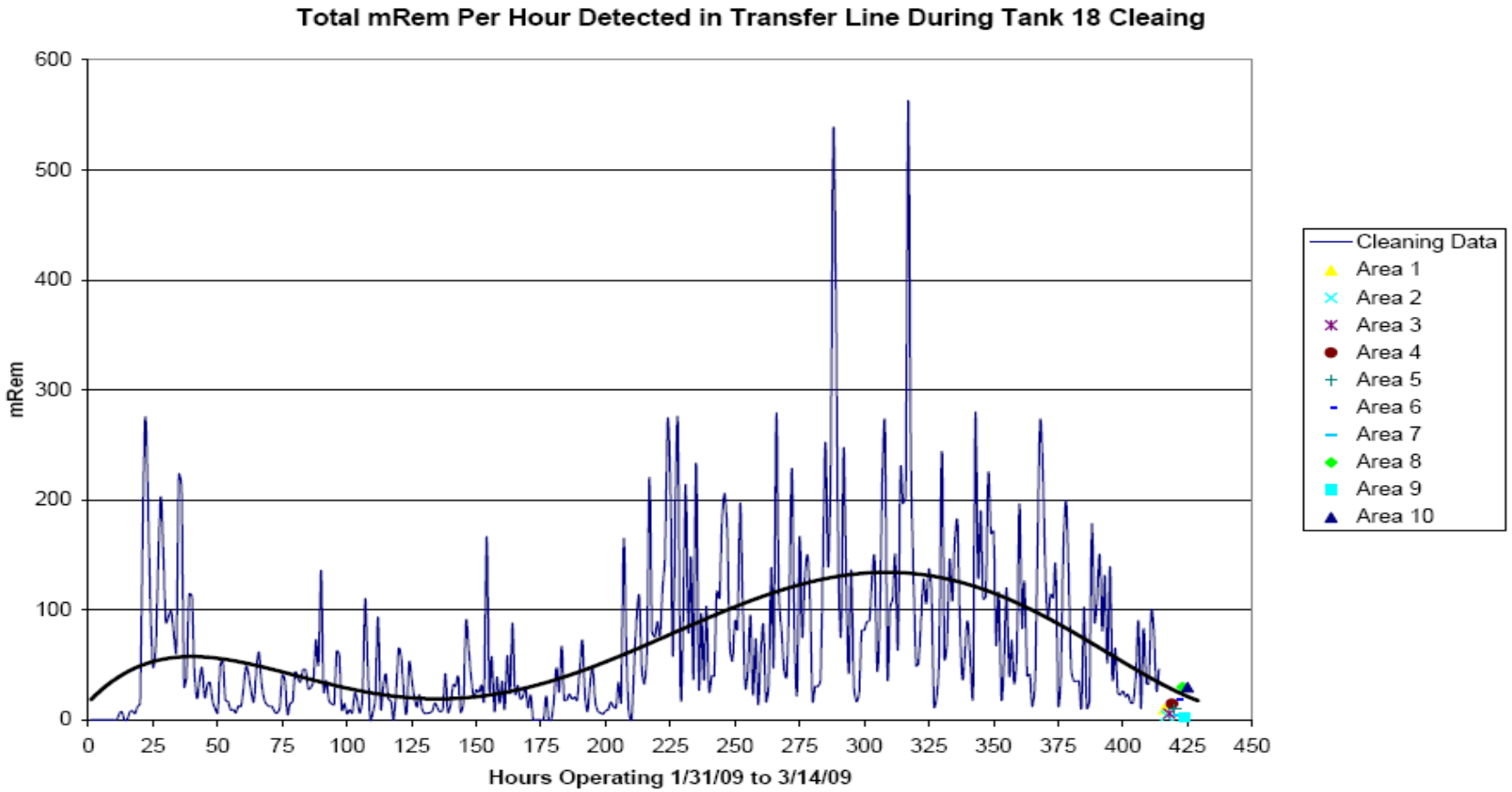
# Operation

- Monitoring
  - Fluid Parameters
    - Pressures, Temperatures, Flows
  - Diesel Engine Parameters
  - Motor current
  - Leak Detection
  - Radiation
    - Portable radiation monitors installed both inside and outside shielding. Used data from inside shielding to measure cleaning effectiveness.

# Operation Tank 19



# Tank 18 Operation



# Results Tank 18

- **Approximately 1000 gallons remaining based on preliminary mapping**

# Results Tank 19

- **Approximately 1000 gallons remaining based on preliminary mapping**

# Questions and Answers

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